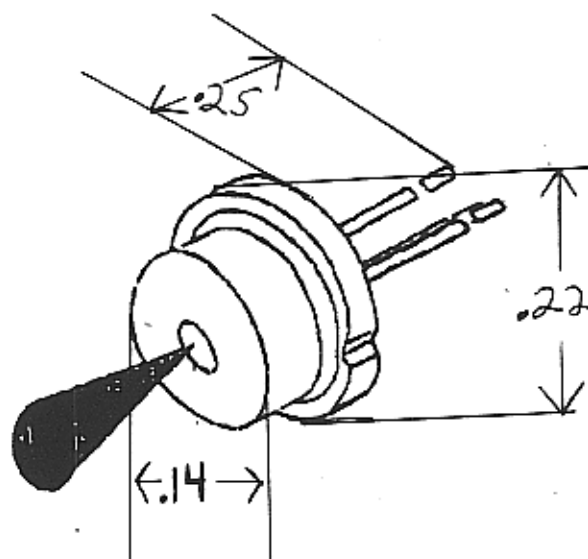


635 nm, 650 nm & 660 nm
Visible Laser Diode

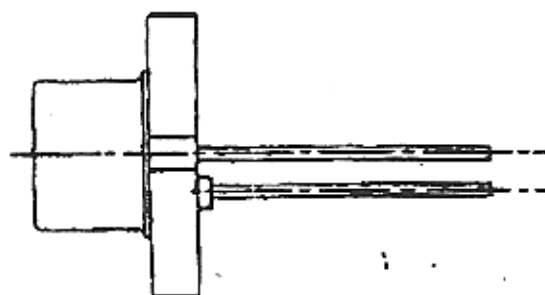
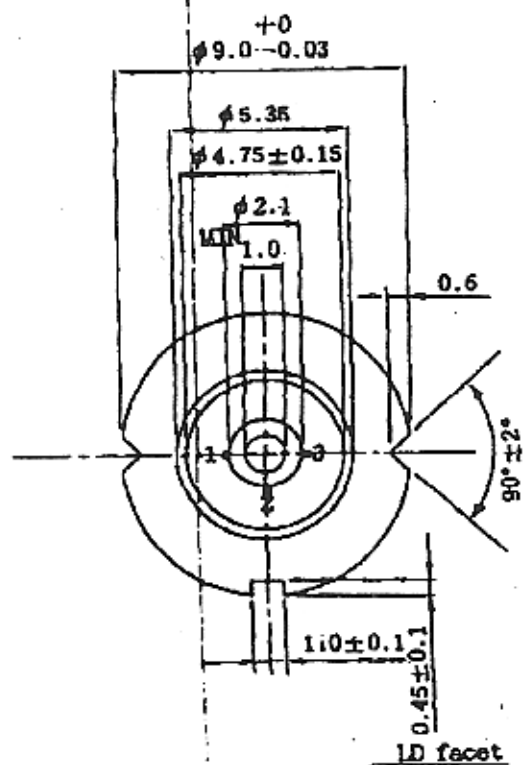
APPLICATIONS

- Laser Beam Scanner
- Bar Code Scanner
- Measurement/Alignment System
- Optical Disk Memory
- Optical Sensor

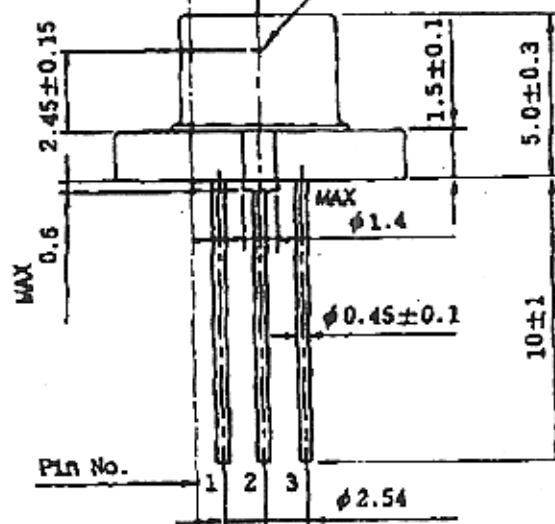
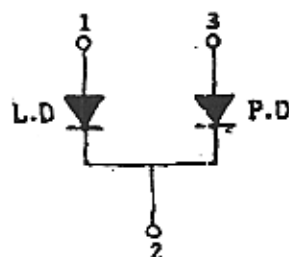


SPECIFICATIONS

MODEL	APLD670-56	APLD660-5T	APLD650-3T	APLD635-3T
STRUCTURE	GAIN GUIDED	INDEX GUIDED	INDEX GUIDED	INDEX GUIDED
$P_o(mW)$	5	5	3	3
$I_{th}(mA)$	5	30	60	80
$I_{op}(mA)$	5	40	70	90
$V_{op}(V)$	2.3	2.3	2.4	2.5
$\lambda_s(nm)$	670	660	650	635
$\theta_1(deg.)$	7	8	8	8
$\theta_2(deg.)$	31	29	29	30
$\lambda_s(\mu m)$	30	11	11	11
PACKAGE(mm)	9.0, r.6	5.6	9.0	9.0

Tolerance : ± 0.2

Unit : mm

 $\Delta X, \Delta Y : \pm 70 \mu m$ Pin Connection

LD-85MC/PC oscillate at a wave length* which matches the sensitivity of silicone photo diode; the most suitable laser DDL RLD-83MF/PF in relaxation oscillation, 3e and RLD-78MF/PF in self-pulsation mode reduce modal a in multi-mode optical bers. Their characteristics are very suitable to digital/ analog optical link applications. RLD78MIT/PIT features high response, long life, and high reliability, which are favorable for data communications such as Fiber Channel standard.

Part No	Application	Wavelength λ_D (nm)	Absolute maximum ratings ($T_C=25^\circ\text{C}$)			Optical/electrical characteristics ($T_C=25^\circ\text{C}$)						Condition P_O (mW)	Package/ Integrated Circuit	Basic error unit (sec.)	Re-
			P_O (mW)	V_F (V)	$T_{OP\text{ MAX}}$ ($^\circ\text{C}$)	V_F (V)	I_{FR} (mA)	I_{OP} (mA)	I_{IN} (mA)	$\theta_{\perp}$ (deg)	$\theta_{//}$ (deg)				
LD-78MF	Optical link	785	5	2	80	1.8	35	45	0.2	37	11	3	Fig.1	500	
LD-78PF		785	5	2	80	1.8	35	45	0.2	37	11	3	Fig.2	500	
LD-83MF		830	5	2	80	1.8	35	45	0.2	30	11	3	Fig.1	500	
LD-83PF		830	5	2	80	1.8	35	45	0.2	30	11	3	Fig.2	500	
LD-85MC		850	5	2	80	1.8	30	40	0.2	30	11	3	Fig.1	500	
LD-85PC		850	5	2	80	1.8	30	40	0.2	30	11	3	Fig.2	500	
LD-78MIT		785	5	2	80	1.8	35	45	0.2	37	11	3	Fig.1	500	
LD-78PIT		785	5	2	80	1.8	35	45	0.2	37	11	3	Fig.2	500	

* Unless otherwise specified, the electrical and optical characteristics are typical values.

○ : Semi-standard product

For Optical Disc Drives

High-power lasers oscillate with stability up to high optical output and exhibit longitudinal multi-mode at low optical output (the reading mode) featuring low noise characteristics compared with conventional high-power lasers. Lasers having these characteristics have been thought difficult to make, but ROHM overcame various problems and was first in the world to manufacture this type of laser. This series is most suitable for optical disc, optical cards and optical measurement equipment.

Part No.	Application	Wavelength λp (nm)	Absolute maximum ratings (Tc=25°C)			Optical/electrical characteristics (Tc=25°C)						Condition Po (mW)	Package/ Integrated Circuit	Basic error unit (sec.)	Remarks
			Po (mW)	Va (V)	Topr max (°C)	Vf (V)	Ith (mA)	Iop (mA)	Iin (mA)	θ⊥ (deg)	θ// (deg)				
D-78M20	Optical disc memory and high-speed LSP	785	20	2	80	1.8	35	55	0.2	30	8	10	Fig.1	50	○
LD-78P20		785	20	2	80	1.8	35	55	0.2	30	8	10	Fig.2	50	○
LD-78M20		785	20	2	80	1.8	35	55	0.2	30	8	10	Fig.3	50	○
LD-78M21	Optical disc, Optical card, Vendoms, etc.	785	30	2	80	1.8	35	55	0.2	30	8	10	Fig.1	50	○
LD-78P21		785	30	2	80	1.8	35	55	0.2	30	8	10	Fig.2	50	○
LD-78M21		785	30	2	80	1.8	35	55	0.2	30	8	10	Fig.3	50	○
LD-78M30		785	30	2	80	1.8	45	65	0.4	25	8	20	Fig.1	50	○
LD-78P30		785	30	2	80	1.8	45	65	0.4	25	8	20	Fig.2	50	○
LD-78M30		785	30	2	80	1.8	45	65	0.4	25	8	20	Fig.3	50	○
D-78M35		785	35	2	80	1.8	50	70	0.8	25	8	30	Fig.1	50	○
D-78P35		785	35	2	80	1.8	50	70	0.8	25	8	30	Fig.2	50	○
D-78M35		785	35	2	80	1.8	50	70	0.8	25	8	30	Fig.3	50	○
D-83M30		Optical disc, Optical card, Vendoms, etc.	830	30	2	80	1.8	45	65	0.2	25	10	20	Fig.1	50
D-83P30	830		30	2	80	1.8	45	65	0.2	25	10	20	Fig.2	50	○
D-83M30	830		30	2	80	1.8	45	65	0.2	25	10	20	Fig.3	50	○
D-83M31	830		40	2	80	1.8	45	65	0.2	25	10	20	Fig.1	50	○
D-83P31	830		40	2	80	1.8	45	65	0.2	25	10	20	Fig.2	50	○
D-83M31	830		40	2	80	1.8	45	65	0.2	25	10	20	Fig.3	50	○
D-83M40	830		40	2	80	1.8	45	100	0.3	25	8	30	Fig.1	50	○
D-83P40	830		40	2	80	1.8	45	100	0.3	25	8	30	Fig.2	50	○
D-83M40		830	40	2	80	1.8	45	100	0.3	25	8	30	Fig.3	50	○

* Unless otherwise specified, the electrical, optical characteristics are typical values.

○ : Semi-standard product

Safety Considerations

The light emitted from laser diodes, while almost invisible to the human eye, can cause retinal damage if viewed directly. Never look directly into the laser beam or through lenses or fibers when the system is operating.



6/6

For Compact Disc Players

Noise problem is eliminated by optimizing design characteristics. Noise from two of the three feedback beams is eliminated through our laser geometry. RLD 78MA4/PA4 series requires lower power compared to any other laser diodes on the market, and will support semandering system design. RLD78MAT1/PAT1/MAT2/PAT2 is suitable when high reliability is required.

Part No.	Application	Wavelength λ_p (nm)	Absolute maximum ratings (Tc=25°C)			Optical/electrical characteristics (Tc=25°C)							Package/ Equivalent Integrated Circuit	Basic order unit (pcs.)	Rank
			P _o (mW)	V _f (V)	T _{opr. max.} (°C)	V _f (V)	I _{TH} (mA)	I _{op} (mA)	I _m (mA)	$\theta_{\perp}$ (deg)	$\theta_{//}$ (deg)	S/N Min. (dB)			
RLD-78MA	Compact Disc	780	5	2	60	1.8	35	45	0.2	37	11	60	Fig. 1	500	②
RLD-78PA	Disc	780	5	2	60	1.8	35	45	0.2	37	11	60	Fig. 2	500	③
RLD-78MA3	Disc	780	4	2	60	1.8	30	40	0.2	37	11	60	Fig. 1	500	②
RLD-78PA3	Disc	780	4	2	60	1.8	30	40	0.2	37	11	60	Fig. 2	500	③
RLD-78MA4	Disc	780	4	2	60	1.8	25	35	0.2	37	11	60	Fig. 1	500	②
RLD-78PA4	Disc	780	4	2	60	1.8	25	35	0.2	37	11	60	Fig. 2	500	③
RLD-78MAT1	Disc	780	5	2	60	1.8	35	45	0.2	37	11	60	Fig. 2	500	②
RLD-78PAT1	Disc	780	5	2	60	1.8	35	45	0.2	37	11	60	Fig. 1	500	③
RLD-78MAT2	Disc	780	5	2	60	1.8	35	45	0.2	37	11	60	Fig. 2	500	②
RLD-78PAT2	Disc	780	5	2	60	1.8	35	45	0.2	37	11	60	Fig. 1	500	③

Note: 1. Unless otherwise specified, the electrical and optical characteristics are typical values.

②: Standard products ③: Semi-standard products

For Video Disc Players

Consistency of low noise, low astigmatism and stable production can be realized by self-pulsations. S/N is typically 100 dB. Astigmatism is typically 5 μ m which enables to solve crosstalk problem.

Part No.	Application	Wavelength λ_p (nm)	Absolute maximum ratings (Tc=25°C)			Optical/electrical characteristics (Tc=25°C, P _o =3mW)							Package/ Equivalent Integrated Circuit	Basic order unit (pcs.)	Rank
			P _o (mW)	V _f (V)	T _{opr. max.} (°C)	V _f (V)	I _{TH} (mA)	I _{op} (mA)	I _m (mA)	$\theta_{\perp}$ (deg)	$\theta_{//}$ (deg)	S/N Min. (dB)			
RLD-78MV	VO and LD	780	5	2	60	1.8	45	55	0.2	37	11	55	Fig. 1	500	②
RLD-78PV	Disc	780	5	2	60	1.8	45	55	0.2	37	11	55	Fig. 2	500	③

Note: 1. Unless otherwise specified, the electrical and optical characteristics are typical values.

②: Standard products ③: Semi-standard products

For Sensors and General Measurements

RLD-78MC/PC are the best choice when high coherency is required for sensing and measurement at 780 nm. ROHM's mass production technology established for CD is flexible enough to meet any volume.

Part No.	Application	Wavelength λ_p (nm)	Absolute maximum ratings (Tc=25°C)			Optical/electrical characteristics (Tc=25°C, P _o =3mW)							Package/ Equivalent Integrated Circuit	Basic order unit (pcs.)	Rank
			P _o (mW)	V _f (V)	T _{opr. max.} (°C)	V _f (V)	I _{TH} (mA)	I _{op} (mA)	I _m (mA)	$\theta_{\perp}$ (deg)	$\theta_{//}$ (deg)	S/N Min. (dB)			
RLD-78MC	Sensors, Readers, etc.	780	5	2	60	1.8	35	45	0.2	37	11	-	Fig. 1	500	②
RLD-78PC	Readers, etc.	780	5	2	60	1.8	35	45	0.2	37	11	-	Fig. 2	500	③

Note: 1. Unless otherwise specified, the electrical and optical characteristics are typical values.

②: Standard products ③: Semi-standard products

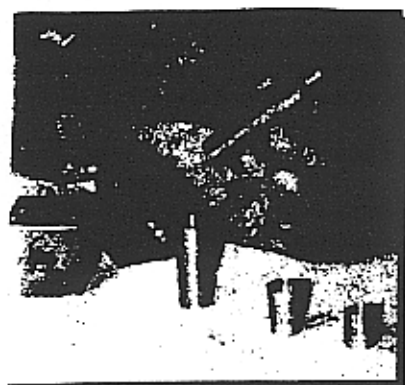
For Laser Beam Printers

Low droop can be achieved with small-package laser, ϕ 5.6, thanks to design technology unique to ROHM. The laser can be used for LBP applications. Low droop characteristic, typ 5%, will improve printing quality. RLD-78, MP10/PP10/NP10 are specially designed to have high power (P_o, max. 10 mW) for high speed printing.

Part No.	Application	Wavelength λ_p (nm)	Absolute maximum ratings (Tc=25°C)			Optical/electrical characteristics (Tc=25°C, P _o =3mW)							Package/ Equivalent Integrated Circuit	Basic order unit (pcs.)	Rank
			P _o (mW)	V _f (V)	T _{opr. max.} (°C)	V _f (V)	I _{TH} (mA)	I _{op} (mA)	I _m (mA)	$\theta_{\perp}$ (deg)	$\theta_{//}$ (deg)	Droop (%)			
RLD-78MP	Printer	780	5	2	60	1.8	35	45	0.55	30	11	5	Fig. 1	500	②

LT Laser Module

ation



The LT series is designed as the high performance diode laser module with flexible and modular characteristics. Which brings out the ultimate performance in optical quality and easy operation. Any function you want, you can find it here. The most attractive feature is its unmatched price in the world.

- ☐ Wide Range of Wavelength And Output Power Available
- ☐ Adjustable Focus
- ☐ Adjustable Optical Output Power
- ☐ Two Shape Spot Selectable by Different Collimator Lens
- ☐ Super Fine Pitch (0.25mm) For Precision Focusing
- ☐ Ultimate Electronic Protection
- ☐ Standard English Size (Dia.=0.6 inch, L=2 inches)
- ☐ Line Optics And Beam Expander For Option
- ☐ Green LED Indicator

Optics

Modular design optical structure is one of the main feature of LT series laser module. In this design, you have different design of collimating lens to meet most requirements. The first type of optics is a plastic lens that provides a circular beam comparable with output of HeNe laser. The second type of optics is a three element glass lens that provides an oval shape output beam with the highest output efficiency

Circular Collimating Lens

Limite has designed a special collimator lens. This lens is designed for correct the oval spot of the diode laser module. It is a aspheric lens and PMMA material, manufacture under the best quality.

Spot Image, AIRY Disk



Note : How to Define Spot Diameter
Normal, you will see the spot image like graphic show left. D1=84% of total energy, D2=91% of total energy. Limite uses D1 as our definition of the spot size.
Source : Modern Optical Engineering 2ED
MCGRAW-HILL, INC., NEW YORK

Model	LTC802	LTC502	LTC504	LTC507	LTC405	LTC352	LTC354
Wavelength (nm)	660	650	660	660	640	635	635
Max. Output Power (mW)	2	2	4	7	5	2	4

- Single Element Aspherical Collimating Lens (PMMA)
- Circular Beam Shape
- Focusing Range 20 cm To Infinity
- Beam Size at 1m (Factory Preset) Dia. 2.3 mm
- Beam Size at 7m (Factory Preset) Dia. 4.5 mm
- Beam Divergence 0.18 mrad

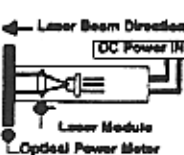
Electronic

The design of the driver circuitry is a result of many years of research and development in the field of diode lasers at Limite Company. It provides a very safe and stable power source for laser diodes. It allows the output power to be adjusted externally without damaging the diode laser.

The standard LT series use a APC(Automatic Power Control) technology and standard 5VDC supply. The output is remained constant within +/-1V input. Customized driver designs to fit various applications are also available.

3-Element Glass Lens

In many of the applications, shape of the spot is not the most important thing but brightest spot. In this case Limite designs a 3-element glass lens to collect almost all the power from the laser diode.



Note : How We Measure Output Power

Since we know the atmosphere will decay the power of the laser beam at different level (decide by wavelength). Limite defines the output power as the laser beam just pass through the collimator lens.

Model	LTG604	LTG504	LTG507	LTG5017	LTG4013	LTG354	LTG357
Wavelength (nm)	660	650	650	650	640	635	635
Max. Output Power (mW)	4	4	7	17	13	4	7

- 3 Element Glass Collimator Lens
- Oval Beam Shape
- Focus Range 7cm to Infinity
- Beam Size at 1m(Factory Preset) Oval 2 x 5 mm
- Beam Size at 7m(Factory Preset) Oval 5 x 8 mm
- Beam Divergence 0.2 mrad

Note : LTC6017(660nm,17mW) and LTG6040(660nm,40mW) are also available under request.

Other Circuits Available

1. Direct Driver Circuit (D.D) : For users to add modulation functions (modulator circuit not included).
2. Automatic Current Control circuit (A.C.C.) : Constant current source for laser diode.

- Input Voltage (5V typ.) 4V to 6V DC
- Operating Current 40mA to 80mA
- Storage Temperature -40 to 85C
- Operating Temperature -10 to 40C
- Soft-Start for Electric Pulse Protection
- Shot Circuit Protection
- Opposite Pole Connect Protection

Attn: Judy Purrington - Arndt
 From: Emily Hwa - Offshore

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$)

	Symbol	Min	Typ	Max	Test Conditions
Optical output power (mW)	P_o	—	—	5	Kink free
Threshold current (mA)	I_{th}	25	20	40	
Operating current (mA)	I_m	—	35	50	$P_o = 5 \text{ mW}$
Operating voltage (V)	V_m	—	—	2.5	$P_o = 5 \text{ mW}$
Emission wavelength (nm)	λ_e	790	808	810	$P_o = 5 \text{ mW}$
Beam divergence (degree)	$\theta_{\perp}$	5	8	11	$P_o = 5 \text{ mW}$
Beam divergence (degree)	$\theta_{\parallel}$	25	31	37	$P_o = 5 \text{ mW}$
Monitor current (μA)	I_{μ}	—	10	—	$P_o = 5 \text{ mW}$, $V_R = 5 \text{ V}$
Astigmatism (μm)	Δ_s	—	5	—	$P_o = 5 \text{ mW}$, $NA = 0.4$

ABSOLUTE MAXIMUM RATINGS ($T_c = 25^\circ\text{C}$)

	SYMBOL	RATED VALUE
Optical output power (mW)	P_o	5
LD reverse voltage (V)	V_{RDM}	2
PD reverse voltage (V)	V_{RDM}	30
Operating temperature ($^\circ\text{C}$)	T_{op}	-10 to +45
Storage temperature ($^\circ\text{C}$)	T_{stg}	-40 to +85

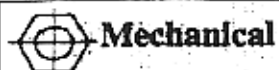
APLD808-5I Laser Diode

Pag

96

LT Laser Module

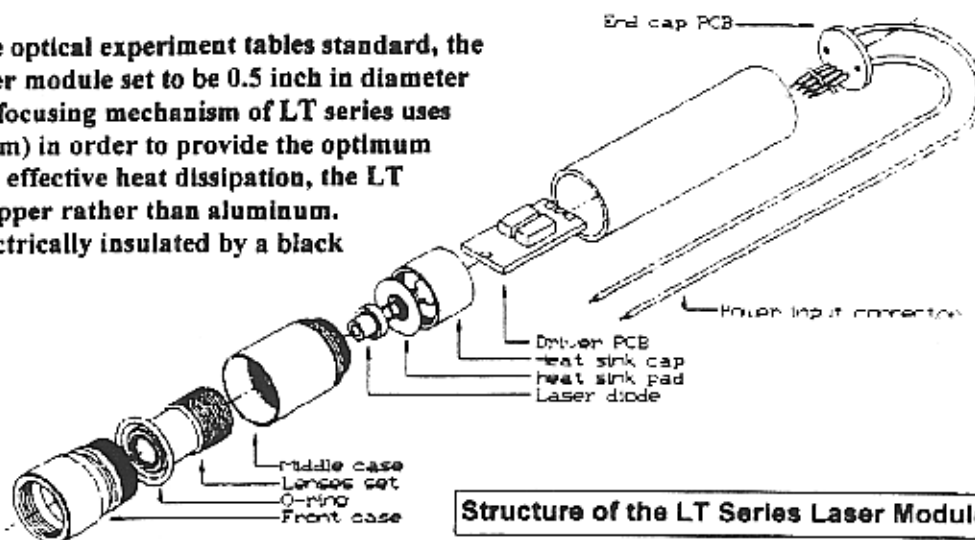
oration



Mechanical

In order to meet most of the optical experiment tables standard, the dimensions of LT series laser module set to be 0.5 inch in diameter and 2 inches in length. The focusing mechanism of LT series uses very fine thread size (0.25mm) in order to provide the optimum focusing. To achieve a more effective heat dissipation, the LT series housing is made of copper rather than aluminum. The module's housing is electrically insulated by a black coating.

- * Dia.=1/2 inch(12.7mm)
- * Length=2 inch(50.8mm)
- * Focusing resolution=0.25mm
- * Green LED indicator
- * Power adjust SVR at the end of module
- * Electric insulate black coating

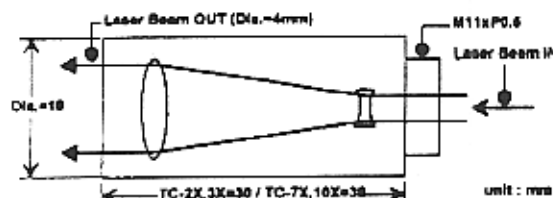


Structure of the LT Series Laser Module



Options

Compact Beam Expanders

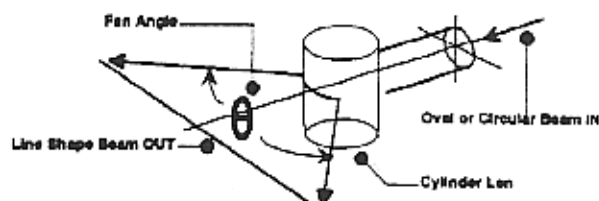


These compact beam expanders give you the ultimate performance in optic quality. They are compact, easy to use and focus adjustable.

Model	TC-2X	TC-3X	TC-7X	TC-10X
Divergence	<0.25mrad	<0.17mrad	<0.07mrad	<0.05mrad

- * Max. Entrance Aperture Dia. 4mm
- * All Optical Glass Lens with AR Coating
- * Focus Adjustable Range From 50cm To Infinity
- * Applicable Long Working Distance In Min. Spot Size
- * Connect To LT Series Laser Module Directly

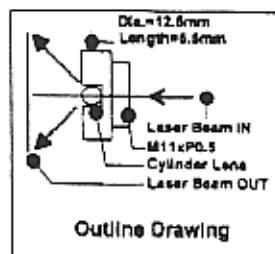
Line Generating Optics



The line generator optics creates a new dimension of the laser application. Bar code reader, 3D laser scanning system, laser show effect...etc. If you need a line shape laser beam, try this.

Model	LO-90
Fan Angle	90 Degrees

- * Line Shape Laser Beam Generator
- * All Optical Glass Lens
- * Focus Adjustable From 50cm To Infinity.
- * Connect to LT Series Laser Module Directly



Outline Drawing

Operation

Warning: Avoid direct or mirror reflected exposure to eyes. (Laser Class II/IIIa) To get specified parameters the laser was set up in a thermal stabilized mount. Connect the free wires of the Power Supply to your DC source. The red wire is in positive, the black wire is in negative.

Caution: Switch on external DC source first before connect to laser.

Warranty: Manufacturer warrants Laser Module to be free from defects for a period of 12 months from the date of shipment. If found to be defective during the warranty period, the product will either be repaired. This warranty does not apply to defects resulting from modification or misuse of product.

■ DESCRIPTION

Sanyo Laser Diode DL-5032-101 is GaAlAs double heterostructure laser diode, which has been developed as a light source for the optical information processing systems.

■ FEATURES

- High output power (MAX. 40 mW)
- Low threshold current
- PIN photodiode built-in for light output monitor

■ APPLICATIONS

- Optical disk memory for WORM
- Optical disk memory for record/play
- Communication systems

■ ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Parameter	Symbol	Rating	Unit
Light Output	P _o	40	mW
Reverse Voltage	Laser	2	V
	PIN	30	
Power Dissipation (PIN)	P _a	15	mW
Operating Temperature	T _{opr}	-10 ~ +50	°C
Storage Temperature	T _{stg}	-40 ~ +85	°C

■ ELECTRICAL / OPTICAL CHARACTERISTICS (Tc=25°C) **

ELECTRICAL / OPTICAL CHARACTERISTICS (TC=25°C)							
Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit
Threshold Current		I _{th}	—	—	50	70	mA
Operating Current		I _{op}	P _o = 30 mW	—	100	150	mA
Lasing Wave Length		λ _p	P _o = 30 mW	815	830	845	nm
Light Output		P _o	—	—	30	—	mW
Beam Divergence	Perpendicular	θ _⊥	P _o = 30 mW	15	25	35	deg
	Parallel	θ _∥	P _o = 30 mW	7	10	13	deg
Off Axis Angle	Perpendicular	Δθ _⊥	P _o = 30 mW	—	—	±3	deg
	Parallel	Δθ _∥	P _o = 30 mW	—	—	±3	deg
Differential Efficiency		dP _o /dI _{op}	P _o = 30 mW	0.30	0.60	—	mW/mA
Monitoring Output Current		I _m	P _o = 30 mW	50	200	—	μA

** Initial values ** Full angle at half maximum